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Pseudorecurrence following female laparoscopic inguinal hernia repair in children

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ABSTRACT

Laparascopic repair of inguinal hernias in female children can be achieved using the inversion and ligation technique in which the hernia sac is inverted into the peritoneal cavity and ligated using endoloops. This technique has been shown to reduce operative time and post-operative complications such as missed contralateral hernia, wound infection and hernia recurrence. We describe a case of a 3-month old female who underwent laparoscopic repair of bilateral inguinal hernias, and presented one year post-operatively with bilateral groin bulges. On re-operation the bulges were determined not to be true hernia recurrences, but rather pseudorecurrences of accumulated fluid distal to the ligation point after incomplete inversion. They were successfully repaired in an open fashion, without subsequent development of groin bulges.

Laparascopic approaches to inguinal hernia repair in children were first described in 1997 [1]. Although various approaches have since been developed, the original inversion and ligation technique is the favored technique for inguinal hernia repair in young girls. In addition to the standard benefits of laparoscopy such as decreased pain and infection and favorable cosmetic results, this approach has been shown to have decreased rates of missed contralateral hernia and recurrence [2–5]. In this report we describe the case of a 3-month old female who underwent bilateral laparascopic inguinal hernia repair using the inversion and ligation technique, who developed bilateral groin bulges one year later that were found to be fluid accumulations rather than true hernia recurrences.

1. Case report

A three month old former full-term female child presented to the outpatient office for evaluation of a right groin bulge. The bulge was present for approximately one month prior to presentation, and would protrude and resolve spontaneously. The child was otherwise well, tolerating a diet, having normal bowel movements and was without any other significant medical problems. The parents also believed that a left-sided bulge might be present, but they had not visualized it as clearly as the right-sided bulge. On examination, a right inguinal bulge was present and readily reducible, but no left-sided defects were appreciated. The patient was therefore scheduled for an elective laparoscopic repair of a right inguinal hernia, with laparoscopic assessment of the left internal ring and possible left inguinal hernia repair.

In the operating room, the abdomen was entered through a transumbilical incision and insufflated through a 5 mm trocar. The right inguinal ring was visualized and found to be widely patent, consistent with the preoperative examination. Through a separate 3 mm stab incision, the right inguinal hernia sac was grasped, inverted and then ligated with a 5 mm 0-PDS Endoloop™ device that was delivered into the abdomen alongside the 5 mm umbilical trocar. The left internal ring was then assessed and also deemed to be patent, and so the inversion and ligation was repeated in a similar fashion on the left with a second 5 mm O-PDS Endoloop™ device. The excess inverted hernia sacs were divided and removed. The patient was discharged home after an uneventful recovery, and returned for a postoperative visit three weeks later. At that visit, her laparoscopic incisions had completely healed and there were no bulges present in the groin.

The patient returned to the outpatient office one year later, when the parents noted that again a bulge was present in both groins. On examination, very subtle bulges could be appreciated in the bilateral inguinal regions. The clinical picture was consistent with recurrences of her bilateral inguinal hernias, and we therefore

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elected to return to the operating room for repair. We began with a laparoscopic approach, again entering the abdomen through a transumbilical incision and placing a 5 mm umbilical trocar. However, upon visualization of the bilateral inguinal rings, both rings were completely closed. Additionally, neither bulge in the groin changed in size with insufflation of the abdomen. The abdomen was therefore desufflated, and a standard inguinal incision was made over the left external ring. Upon exposure of the external oblique, we identified a fluid-filled bulge emerging from the left external ring (Fig. 1), consistent with a left inguinal hernia sac. However, when the sac was opened, no communication was present between the sac and the peritoneal cavity, suggesting anatomy that was more consistent with a non-communicating hydrocele rather than a classic inguinal hernia. We hypothesized that perhaps these bulges developed following an incomplete inversion of the hernia sacs during the initial laparoscopic repair, rather than as a re-opening of the hernia at the level of the internal ring (Fig. 2). The sac was therefore suture ligated at its base and the excess hernia sac excised. A second incision was subsequently made over the right external oblique, and again a fluid-filled right inguinal hernia sac was identified. Opening of the right inguinal hernia sac again failed to demonstrate any patency or communication with the peritoneal cavity. The right sac was ligated and excised. The incisions were closed and the patient was discharged home after an uneventful recovery. She returned to our outpatient office for a postoperative visit one month later, with no evidence of any groin bulges. Follow-up six months later by phone confirmed that no bulges had recurred.

2. Discussion

The laparoscopic approach to pediatric inguinal hernia repair was first described in 1997 [1]. These early approaches involved inversion and ligation of the hernia sac using an Endoloop, which was performed exclusively in female children. Proponents of a laparoscopic approach to inguinal hernia repair have highlighted the ability to explore the contralateral inguinal ring and other hernia sites, and decreased operative time for cases of bilateral repair. Additionally, laparoscopic approaches to hernia repair provide the standard benefits associated with laparoscopy such as decreased pain, decreased infection and favorable cosmetic results [2–5].

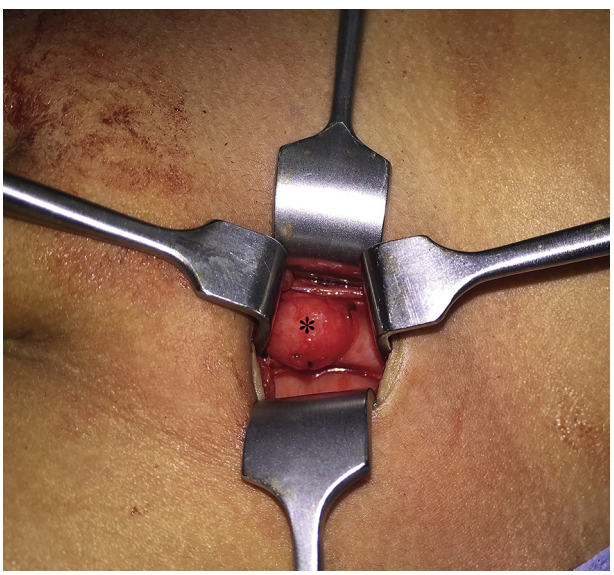

Fig. 1. Recurrent groin bulge after laparoscopic inguinal hernia repair in a female child. A fluid-filled bulge is readily appreciated (*) bulging out of the left external inguinal ring.

Fig. 2. Lack of patency in recurrent inguinal hernia. No patency could be demonstrated from the opened hernia sac into the peritoneal cavity, as demonstrated here by inability to pass a blunt-tip trocar into the abdomen through the sac. This was preceded by multiple attempts with small catheters and saline injection. This finding, coupled with the laparoscopic visualization of closed internal rings, may suggest that the bulges which presented one-year postoperatively may have represented "pseudorecurrences" – essentially non-communicating hydroceles which developed following incomplete inversion of the hernia sacs during the initial laparoscopic repair.

Since inversion and ligation was first described, several other techniques have been developed to perform minimally invasive inguinal hernia repair in children. Authors report that use of extracorporeal knotting techniques may be associated with lower recurrence rates, but require additional instrumentation and trocar sites. Experience with intracorporeal knotting techniques has demonstrated a higher recurrence rate as well as a steeper technical learning curve [2]. As a result, most pediatric surgeons who perform laparoscopic inguinal hernia repair in female children favor the inversion and ligation technique, which was the approach utilized in this case. Multiple instruments may be introduced through the umbilical port site in a modified single incision laparoscopic surgery fashion, or through separate lower abdominal incisions. The hernia sac is inverted into the peritoneal cavity and endoloops are used to achieve a high ligation. The hernia sac can then be left *in situ* or resected [6,7]. Regardless of the technique, both internal rings can be assessed and a bilateral repair can be performed if necessary.

Reported outcomes following laparoscopic repair of pediatric inguinal hernias are quite good [3–6]. Esposito et al., found that laparoscopic repairs have lower rates of recurrence, wound infections, and hydroceles when compared to open repair [3]. Yang et al., found that laparoscopic inguinal hernia repair is comparable to open repair in children with respect to operative time, hospital stay and time to resume activity [5]. Two different case series focusing on inversion and ligation repair found no wound complications [4,6].

Complications of female inguinal hernia repairs, both open and laparoscopic, are generally low and include wound infection, contralateral inguinal hernia, and recurrence [8]. Recurrence is uncommon in females, particularly with an open repair in which the internal ring is closed [8]. Given the decrease in missed contralateral hernias and wound infection rates seen with laparoscopic repairs, recurrence represents the primary complication surgeons focus on with regard to this technique. In two case series reviewing outcomes of inversion and ligation repair, recurrence occurred in 2 out of 173 and 2 out of 79 cases [4,6]. In these cases, recurrence was associated with leaving the hernia sac *in situ*.

This case represents a pseudorecurrence rather than a true recurrence as the internal ring remained closed at the time of reoperation. While similar appearing hydroceles of the Canal of Nuck have been described in pediatric patients previously [9–11], they have not been described following laparoscopic repair of an inguinal hernia. During a laparoscopic repair of an inguinal hernia in a female child, incomplete inversion of the hernia sac may allow fluid to accumulate distally, resulting in a fluid-filled bulge that mimics a true hernia recurrence, as was seen with our patient. We have since made two modifications to our technique in hopes of ensuring a more complete sac inversion and ligation. First, we now manually palpate the external labia majora as we advance the laparoscopic grasper down the hernia sac, allowing us to feel the tip of the instrument at the absolute apex of the hernia sac. Secondly, following ligation of the inverted sac, we perform a generous electrocauterization of the excess sac to induce local injury at the internal ring, which previous authors have advocated to further reinforce the closure [12].

Clinically, a pseudorecurrence may be distinguished from a true recurrence on the basis of reducibility. Additionally, a recurrent hernia may change in size with increased abdominal pressure such as crying or straining to stool. Ultrasound of the groin following inversion repair shows a rosebud structure at the inguinal ring that gradually decreases in size over several months [13]. In contrast, a hydrocele of the Canal of Nuck appears as a well circumscribed cyst without peristaltic movements or changes with abdominal pressure [9,10]. Given the similarity in clinical presentation, a pseudorecurrence following laparoscopic repair may not be distinguishable from a true recurrence on the basis of ultrasound alone.

The development of a groin bulge following inguinal hernia repair should be considered a true recurrence until proven otherwise, with diagnostic and therapeutic interventions targeted at reducing the risk of ovarian or intestinal incarceration. Given the sensitivity of a pediatric surgeon's clinical exam and the relative urgency with which such recurrences are usually addressed it is rare for ultrasound imaging of a groin mass to be obtained prior to scheduling re-operative repair. Even if one were to entertain with high suspicion that a recurrent bulge after laparoscopic inguinal hernia repair represented a pseudorecurrence, we would not advocate percutaneous approaches to draining this fluid compartment. A case report of a hydrocele in an adult female describes reaccumulation of fluid after it was aspirated. [14], but the real risk would be an error in diagnosis that would result in intestinal injury from such a maneuver.

Surgery should remain the standard therapy for addressing recurrence or pseudorecurrence following laparoscopic inguinal hernia repair in young girls [11]. The optimal approach to reoperation is a topic of debate. In the case series mentioned previously, both open and laparoscopic approaches are used for recurrences [4,6]. Based on our case data presented here, we would advocate that a potential pitfall of repeat laparoscopy in the setting of recurrence is that if the recurrent bulge in question is indeed a pseudorecurrence, it may not be seen from the peritoneal cavity, and therefore one must strongly consider an open approach to visualize and repair the pseudorecurrence.

Disclosure

No competing financial interests exist.

References

[1] El-Gohary MA. Laparoscopic ligation of inguinal hernia in girls. Pediatr Endosurg Innov Tech 1997;1:185–8.
[2] Lukong CS. Surgical techniques of laparoscopic inguinal hernia repair in childhood: a critical appraisal. J Surg Tech Case Rep 2012;4:1–5.
[3] Esposito C, St Peter SD, Escolino M, Juang D, Settimi A, Holcomb 3rd GW. Laparoscopic versus open inguinal hernia repair in pediatric patients: a systematic review. J Laparoendosc Adv Surg Tech A 2014;24:811–8.
[4] Lipskar AM, Soffer SZ, Glick RD, Rosen NG, Levitt MA, Hong AR. Laparoscopic inguinal hernia inversion and ligation in female children: a review of 173 consecutive cases at a single institution. J Pediatr Surg 2010;45:1370–4.
[5] Yang C, Zhang H, Pu J, Mei H, Zheng L, Tong Q. Laparoscopic vs open herniorrhaphy in the management of pediatric inguinal hernia: a systemic review and meta-analysis. J Pediatr Surg 2011;46:1824–34.
[6] Guner YS, Emami CN, Chokshi NK, Wang K, Shin CE. Inversion herniotomy: a laparoscopic technique for female inguinal hernia repair. J Laparoendosc Adv Surg Tech A 2010;20:481–4.
[7] Zallen G, Glick PL. Laparoscopic inversion and ligation inguinal hernia repair in girls. J Laparoendosc Adv Surg Tech A 2007;17:143–5.
[8] Ein SH, Njere I, Ein A. Six thousand three hundred sixty-one pediatric inguinal hernias: a 35-year review. J Pediatr Surg 2006;41:980–6.
[9] Akkoyun I, Kucukosmanoglu I, Yalinkilinc E. Cyst of the Canal of Nuck in pediatric patients. N Am J Med Sci 2013;5:353–6.
[10] Choi YM, Lee GM, Yi JB, Yoon KL, Shim KS, Bae CW, et al. Two cases of female hydrocele of the Canal of Nuck. Korean J Pediatr 2012;55:143–6.
[11] De Meulder F, Wojciechowski M, Hubens G, Ramet J. Female hydrocele of the Canal of Nuck: a case report. Eur J Pediatr 2006;165:193–4.
[12] Blatnik JA, Harth KC, Krpata DM, Kelly KB, Schomisch SJ, Ponsky TA. Stitch versus scar–evaluation of laparoscopic pediatric inguinal hernia repair: a pilot study in a rabbit model. J Laparoendosc Adv Surg Tech A 2012;22:848–51.
[13] Akansel G, Guvenc BH, Ekingen G, Sozubir S, Tuzlaci A, Inan N. Ultrasonographic findings after laparoscopic repair of paediatric female inguinal hernias: the 'vanishing rosebud'. Pediatr Radiol 2003;33:693–6.
[14] Stickel WH, Manner M. Female hydrocele (cyst of the Canal of Nuck): sonographic appearance of a rare and Little-Known Disorder. J Ultrasound Med 2004;23:429–32.